PERFORMANCE, MARKET ANOMALIES, TRADING VOLUME & STOCK INDEX RELATIONSHIPS IN NEGLECTED MARKETS

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ABSTRACT

The purpose of this project is threefold. First, it studies the importance of "Month-of-the-Year Effect" and "Day-of-the-Week Effect" in the neglected stock markets. Second, it examines the extent of correlation between the U.S. stock market and the neglected stock markets. Third, it studies the causality effect between the trading volume and the stock returns in these markets. While most studies are conducted on developed stock markets, few studies are conducted on the neglected stock markets. This project studies Turkey; Pakistan, Norway, Chile and Bangladesh because they are representative of some major regions and that they have shown above average performance in recent years.

Granger causality tests and t-statistics are employed for the purpose of our study. The results show that the causal relationship is present between the U.S. market and the three neglected markets including Norway, Chile, and Pakistan. Our results also suggest that all the five neglected stock markets have the Day-of-the-Week and Month-of-the-Year effect. Moreover, causal relationship between stock returns and trading volume are present in the neglected market.

The implications of the existence of these anomalies is that while the strategic asset allocation decision is the most important investment decision, the patterns of daily or monthly market returns also have timing and trading

strategy significance. Finally, one problem faced by global equity investors is the high degree of correlation between the major stock markets of the world. The implications of the low correlation between the neglected markets and the U.S market is that the inclusion of neglected markets in their portfolio can reduce risk.

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CHAPTER I

INTRODUCTION

This project has three objectives. First, it investigates the significance of "Month-of-the- Year Effect" and "Day-of-the-Week Effect" in the neglected stock markets. Second, it examines the extent of correlations between the U.S. stock market and the neglected markets. Third, it studies the causal effect between the trading volume and the stock returns in these markets.

The "Day-of-the-Week-Effect and the "Month-of-the-Year Effect" are among the most widely documented anomalies in stock prices. This has prompted several researchers to investigate some of these anomalies in some major stock exchanges - the United States, United Kingdom, Japan, Canada and Australia. Most studies were conducted at developed markets.

But few studies were conducted on the neglected markets. The definition of neglected markets in this project is rapidly growing stock markets in newly industrialized countries. They are neglected in the sense these markets have shown above average performance in recent years, as compared with the developed countries.

Five markets are chosen for our study. Our selection covers some major regions: Turkey in Middle East; Pakistan and Bangladesh in Asia; Norway in the Nordic; and Chile in Latin America. Our selection criteria of the markets will be detailed in Chapter II.

Existence of these anomalies has implications for asset allocation decisions. While the strategic asset allocation decision is the most important investment decision that every investor should make, the patterns of daily or monthly market returns also have timing and trading strategy significance. If investor could take advantage of these anomalies, they could improve performance than just strict adherence to the strategic asset allocation.

Over the last few years, many neglected markets have shown major increases in market capitalization, annual trading volume and number of listed issues. At the same time, neglected markets exhibited low correlations with the developed markets. The coefficient of correlation measures the degree to which a group of two or more investments move in the same direction in response to a stated event. It is measured on a scale that runs from minus one to plus one.

Many studies reveal that there is a high degree of correlation between the major stock markets of the world. The major stock markets are New York, London, Frankfurt, Toronto, Tokyo and Paris. The high correlations are attributable to the close trading relationships that exist

between the G-7 countries. Their economies are heavily dependent on each other.

The study of the correlations between the neglected stock markets and the U.S. market is important to portfolio managers because the inclusion of stock markets, which exhibit low correlations, in a portfolio can reduce risk.

CHAPTER II

LITERATURE REVIEW

Selection Criteria of the Neglected Markets

The selection of the neglected markets is based on three criteria: (1) the market should have shown above average performance over the past few years; (2) few research have been conducted on the stock market; and (3) the combination of the stock markets should have wide coverage in different geographic zones: namely Asia, Middle East, Latin America and Northern Europe.

Based on the above selection criteria, we have chosen five markets: Pakistan and Bangladesh in Asia, Turkey on the Middle East, Chile in the Latin America, and Norway in Northern Europe.

Market Review

Chile

The government plays a decisive role in the country's economic development. The country has raw materials that include gold, silver, copper, iron, coal, oil and gas. Chile is the world's largest producer and exporter of copper, and the country possesses more than 40 percent of the world's copper deposits.

The Chilean stock market recorded rises of 36 percent in 1989 and 34 percent in 1990 to 182.2 index points. Due to continuing positive economic growth, and a drop in the inflation rate, the market was able to rise by 181.8 percent in 1991. After an additional gain of 13.9 percent in 1992. the index stood at 418.5 points at the end of 1992. In 1993, a generally very positive year for the neglected markets, Chilean stocks rose 31.8 percent.

In these years, high growth rates accompanied by subdued inflation led to a continuing rise in the Chilean stock market. This positive development was supported by outstanding development of Chilean companies; privatization of large state enterprises; attractive new share issues; growing interest on the part of institutional investors in the Chilean stock market; and comprehensive deregulation and liberalization measures in the stock and financial markets.

Chile's stock exchange is "Santiago Stock Exchange". Chile is one of the neglected markets that is relatively open and fairly accessible to foreign investment. While direct purchasing of shares and repatriation of dividends and interest are largely free on the Chilean stock market, the capital originally invested can only be withdrawn again at the end of a year. Long-term profits and interest and dividend income are taxed at 10 percent. The settlement period is two days.

Pakistan

Pakistan's most important source of income is agriculture. The exploitation of mineral resources is becoming increasingly important. In a framework of comprehensive political and economic deregulation and liberalization measures, the Pakistan government opened the capital market to foreign investors at the beginning of 1991. Wide-ranging privatization moves affecting more than 160 state enterprises were made.

In addition, foreign currency restrictions were abolished, and Pakistanis were allowed to have foreign currency accounts. In respect of tax incentive, the government allowed new companies to enjoy tax holidays for three years in urban areas and for up to eight years in underdeveloped rural and marginal areas.

Following these measures, the stock market saw a vast inflow of international capital after its inclusion in the IFCI Composite Index in March 1991. By the end of the year, the IFCI Pakistan Index had risen 204.1 percent to 304.1 points. With falling interest rates, a high rate of economic growth, two controlled devaluations of the rupee, and a continuation of reforms aimed at opening up the economy, the IFCI Pakistan Index rose to 425.0 points by the end of February 1994.

However, Pakistan continues to be faced with high level of public borrowing, high level of spending in the defense and military field, low savings rate, dependence on textile

exports, domestic political disturbances, and a high rate of illiteracy.

Pakistan's stock exchange is "The Karachi Stock Exchange". Trading by foreign investors and repatriation of interest and dividend income are largely free of any restrictions. Long-term profits are tax-free, but interest and dividend income are taxed at 10.5 percent and 10 percent respectively. All shares traded are settled on the following Monday. The settlement period varies between four and eight days. The trading days are Sunday through Thursday. (The market is closed for Friday and Saturday)

Turkey

Agriculture represents a major part of economy of Turkey. Other important industry are textiles and chemicals industries. The Istanbul Stock Exchange was established in 1986. After systematic liberalization and opening up of the market, the Turkish stock market showed strong performance. However, like other neglected markets, the Turkish market had a high level of volatility. At the beginning of 1994, after two American credit-rating agencies lower Turkey's credit rating for foreign debt, the Turkish lira came under massive devaluation pressure, and the stock market collapsed. Turkey is currently faced with the problem of heavy foreign debts, a high level of money supply growth, and a high rate of inflation.

Turkey's stock exchange is "Istanbul Stock Exchange". Turkey is also very open and easily accessible to foreign

investors. There are no restrictions on interest and dividend repatriation. For foreign investors, long-term capital gains are tax-free. But still, capital movement of more than US$50,000 have to be registered with the central bank. The settlement period for trading stock is two days.

Norway

Norway's main industry is shipping. Norway is one of three Nordic markets. Compared with other neglected markets, Norway is more developed and exhibits lower volatility. In 1991 the stock exchanges in Oslo, Bergen and Trondheim merged into one exchange. Norway's stock exchange is "Oslo Stock Exchange".

The Oslo Stock Exchange Index is a capital-weighted yield index which has a base of 100 at January 1, 1983. Norwegian companies normally make one dividend payment per year, from which withholding tax is deducted. In most cases, the rate is 15%. Prior to 1995, Norwegian law regulates the amount foreigners may buy in each separate company. In addition, other limitations may be imposed under company regulations. However, as a consequence of the EEA agreement, foreign ownership restrictions were abolished on January 1, 1995.

Bangladesh

Bangladesh's stock exchange is "Dhaka Stock Exchange". Compared with other neglected markets, the market capitalization of Bangladesh's stock market is smaller and the trading volume is thinner.

There is no capital gains tax on the sale of shares both for local and foreign investors. With the exception of a few reserved sectors, foreign investors are free to invest in Bangladesh in any industrial entity. The settlement period for stock trading is 4 days. The official trading days are Sunday through Thursday.

Day-of-the-Week Effect

A large body of literature, summarized by Thaler (1987) shows that asset returns on Mondays are significantly lower than for four other days of the week. Cross, F. (1973) and French, K (1980) are among the first in confirming the day of the week effect in the spot market.

Using a calendar-time model, Cross (1973) concluded that the performance of stocks, as measured by mean returns, is significantly higher on Fridays than on Mondays. More specifically, the average return for Monday is negative. French (1980) examines the day of the week effect using both calendar-time and trading-time models. He concludes that the negative returns on Monday are primarily incurred during the non-trading period.

Fortin, Rich (1990) found that Monday and Tuesday mean returns are, in most cases, negative with mean returns increasing through the week and peaking on Friday. Mean dealer percentage spreads are essentially unchanged over the week. The results provide evidence that systematic percentage spread changes do not contribute to the observed return anomaly.

DeFusco, McCabe and Yook (1993) found that the negative Monday return might be due to firms timing the release of information after the market closes on Friday. Using firm's board meeting date as a proxy for high information days, it is found that a firms' Monday return near a board meeting date is more likely to be negative than other Monday returns. The remaining days of the week tend to be more positive than similar days further away from the board meeting. The results appear to explain part of the negative Monday effect.

Martikainen, T., and Puttonen, V., (1996) studies the day of the week effects in Finnish financial markets. On the Finnish stock market, significant Monday effect is not observed, but negative returns on Tuesdays and Wednesdays are evident. It is also evident that volume figures are dependent on the day of the week. It appears that thin trading and short selling restrictions may lead to a price dally and consequently negative Tuesday returns in a small regulated stock market.

Several possible explanations have been suggested as to the cause of the Monday anomaly. These include the high Friday return hypothesis, individual trader decision making process, investor psychology, i.e, the existence of a `Blue Monday' syndrome, and the timing of corporate announcements. The consensus appears to conclude that there is something special about closed markets over the weekend relative to closed markets intraweek.

Month-of-the-Year Effect

Berges, McConnell, and Schlarbaum (1984) and Keim (1984) detect excess returns for the month of January. Their studies also show that, independent of the January effect, smaller firms experience higher returns than larger firms. Edward and Edwin (1992) examined odd-lot purchases and sales around the turn of the year. A pattern that is related to the January effect in stock returns is found. The January, or turn of the year effect refers to unusually high returns earned by the common stocks of small firms beginning on the trading day of December and continuing into January, with the effect becoming less pronounced as the month progresses. A significant change in the ratio of odd-lot sales to odd-lot purchases occurs at the turn of the year, which supports the hypothesis that the January effect results from trading by individual investors.

Spill-Over Effect Across National Stock Markets

Numerous studies investigate the transmission mechanism of stock price movements across international stock markets. For example, Eun and Shim (1989) find that innovations (shocks) in the U.S. stock market are rapidly transmitted to the rest of the world, although innovations in other national markets do not have much effect on the U.S. market. Similar findings are documented by Fischer and Palasvirta (1990) and Becker, Finnerty, and Gupta (1990). Von Furstenbeg and Jeon (1989) find that the correlations among the daily stock indices of the U.S., Japan, the UK and

Germany increased significantly after the crash of 1987. Eun and Shim (1989) and Koch and Koch (1991) find that most of the significant intermarket responses are completed within one to two days. On the other hand, Hamao, Masulis, and Ng (1990) find that daily price volatility spills over from the U.S. to Japan and the U.K., and from the U.K. to Japan. In addition to these markets, Theodossiou and Lee (1993) consider the national stock markets of Germany and Canada. They find statistically significant volatility spill-over from the U.S. to all four stock markets, from the U.K. to the Canadian stock market and from the German to the Japanese stock market. Interestingly, there are no volatility spill-over from the Canadian stock market to the other four markets. Moreover, volatility spill-over from the U.S. to the German market and from the German market and from the German market to the Japanese market are weak.

Marathe, A. (1994) found that Pakistan are negatively correlated with the developed countries' world index. The negative correlation between the emerging markets and the different market indices show the scope to which the portfolios can be further diversified and made profitable. Like Marathe's work, this paper will investigate the spill-over effect from the U.S. market to the five neglected markets rather than concentrated on the developed markets.

Granger Causality Between Aggregate Stock Price and Trading Volume

Academic treatment of a price-volume relation can be traced to Osborne (1959), who attempted to model the stock price change as a diffusion process with variance dependent on the number of transactions. This could imply a positive correlation between volume and the absolute value of the price change, as later developed by Clark (1973), Tauchen and Pitts (1983), and Harris (1983). However, by assuming transactions are uniformly distributed in time, Osborne was able to re-express the price process in terms of time intervals, and did not directly address the volume-price issue. An early empirical examination of the volume-price relation was conducted by Granger and Morgenstern (1963). Using spectral analysis of weekly data from 1939-1961. They could discern no relation between movements in a Securities and Exchange Commission composite price index and the aggregate level of volume on the New York Stock Exchange.

Causality tests can provide useful information on whether knowledge of past stock price movements improves short-run forecasts of current and future movements in trading volume, and vice versa. Gallant, Rossi, and Tauchen (1992) showed that more can be learned about the stock market through studying the joint dynamics of stock prices and trading volume than by focusing only on the univariate dynamics of stock prices. French et al. (1987), Chou (1988) and Baillie and DeGennaro (1990) analyzed the relationship between stock

return and volatility in the U.S. market while Poon and Taylor (1992) studied the same issue in the UK market. Some of the studies take into account the persistence of volatility in stock return data. Poterba and Summers (1986) claimed that shocks to the volatility are transitory but not permanent. However, Chou (1988) concluded that persistence of shocks to the stock return volatility is high in the US market during 1962-1985. Lamoureux and Lastrapes (1990) gave evidence to demonstrate that persistence of shocks may be overstated because of the possible structural shifts in the model parameters. Poon and Taylor (1992) investigated the persistence using daily, weekly, fortnightly and monthly returns in the UK from January 1965 to December 1989. They claimed that there is clear persistence of stock volatility, especially for high frequency data.

Smith, Brocato and Rogers (1993) reported bivariate causality test results of weekly returns from markets in the US, the UK, West Germany and Japan from 1979 to 1991. Richardson, Sefcik, and Thompson (1986) examine trading volume and price changes to test for the existence of dividend clienteles. In other tests, price changes are interpreted as the market evaluation of new information, while the corresponding volume is considered and indication of the extent to which investors disagree about the meaning of the information. The construction of tests and validity of the inferences drawn depend on the joint distribution of price changes and volume.

Aybar, C. B. (1992) in his PHD paper found that the price changes in Turkey can be explained to some extent by the volume. The analysis indicates that the Istanbul stock market is very sensitive to the liquidity shortages in the economy.

Price-volume relations also have significant implications for research into futures markets. Price variability affects the volume of trade in futures contracts [Cornell (1981) and Matell and Wolf (1985)]. This has bearing on the issue of whether speculation is a stabilitzing or destabilizing factor on futures prices [Rutledge (1984)]. The time to delivery of a futures contract affects the volume of trading, and through this effect, possibly also the variability of price [Grammatikos and Saunders (1986)]. Moreover, the price-volume relation can indicate the importance of private versus public information in determining investors' demands [Pfleiderer (1984)].

Several recent studies examine the causality between stock prices and trading volume in the U.S. market [Rogalski (1978), Karpoff (1987), Smirlock and Starks (1988), Jain and Joh (1988), and Antoniewicz (1992)]. They used the linear Granger causality tests that similar to the test used in this study. The tests proved that the model have high power in uncovering linear causal relations.

CHAPTER III

DATA AND METHODOLOGY

Day of the Week Effect and Month of the Year Effect

Methodology

This project used mean returns for calculating stock returns and standard deviation for calculating risk of return. The proper study of the anomalies pattern requires risk and returns. To examine anomalous patterns in price distribution, this project assumes normality of the underlying distribution.

Day of the Week Effect

The null hypothesis for testing the day of the week effect is that return on any individual day is significantly different from the mean returns. The return for the day of the week effect is defined as:

$R_t = (P_t - P_{t-1}) / P_{t-1}$

where $(P_t - P_{t-1})$ is the price differential of daily closing price. A review of literature shows that three types of returns: close-to-close returns, close-to-open or non-trading period returns and open-to-close or trading period returns. This project uses close-to-close returns because it is the most appropriate measure for tests of anomalies.

Month of the Year Effect

The null hypothesis that this project tests regarding the month-of-the-year effect is that the return of any individual month is significantly different from the mean returns. The return for the month of the year effect is defined as:

$R_t = (M_t - M_{t-1}) / M_{t-1}$

where $(M_t - M_{t-1})$ is the price differential between month end closing prices.

Data and Sample Period

The dates of the study of each market in respect of month of the year effect and day of the week effect are as follows: April 1 1988 through April 3 1998 for Turkey; December 30 1988 through April 3 1998 for Pakistan; April 1 1983 through April 3 1998 for Norway; July 3 1989 through April 3 1998 for Chile; and April 3 1990 through April 3 1998 for Bangladesh. Holidays are deleted from the data. These data are obtained from Datastream. The data is daily closing stock market indices. Apart from DSE price index for Bangladesh, the market indices in each of the other four markets are created and calculated by Datastream.

The total number of observations in each market (after excluding holidays) for the day of the week effect in each market is as follows: 2,540 days for Turkey; 2,012 days for Pakistan; 3,777 days for Norway; 2,189 days for Chile; and 1,730 days for Bangladesh. For the month of the year effect, the total number of observations in each market area are as

follows: 119 months for Turkey; 108 months for Pakistan; 179 months for Norway; 104 months for Chile; and 95 months for Bangladesh.

Spill-Over Effect Across National Stock Market and Granger Causality Between Aggregate Stock Price and Trading Volume

Methodology

This project uses the Granger causality test to study the spill-over effect between the U.S. stock market and the selected neglected markets. Also, the model will be used to test the causal relationships between the stock return and trading volume in each of the five neglected markets. Prior to the test of causality, we need to make sure that the variables concerned are stationary. To test the stationary of individual variables, the unit root test is first performed.

Unit Root Test

according to Dickey and Fuller (1981), a time series X_t, with the following autoregressive representation and a time trend t:

$$X_t = \alpha_0 + \alpha_1 t + \beta X_{t-1} + \sum_{j=2}^{n} \gamma_j X_{t-j} + \varepsilon_t$$

is said to be non-stationary if $\beta = 1$, where ε_t is an error term, and α_0, α_1, and β are arbitrary coefficients. X can be defined in terms of either price levels or returns. The

null hypothesis of non-stationarity, H_o: $\beta = 1$, is tested with the Dickey-Fuller statistic.

Definitions of Granger Causality Test

The Granger test is a reduced-form regression-F Wiener-Granger causality test [Chamber (1982)]. It is well known that for a bivariate information set, Wiener-Granger causality is defined in terms of the predictive value content of one covariance stationary time series relative to another covariance stationary time series. By definition, a covariance stationary or wide sense stationary time series is one for which the first two moments are time-invariant.

In carrying out the Granger direct test, causal inferences are based on computed F-statistics which are used to test the joint significance of particular lags associated with independent variable in the regression equations. The Granger test uses lags of the dependent variable as right-hand-side variables in order to correct for serial correlation that would arise from an autocorrelated dependent variable. As a result, prefiltering techniques to flatten the spectral density of the regression residuals are obviated. Based on the finds of a Monte Carlo study, Geweke, Meese, and Dent (1983) recommend the use of the Granger direct test because of its desirable statistical properties [Jones (1989)].

The test is specified and implemented as follows. Let (X_t, Y_t) represent the discrete, linearly indeterministic, possibly non-stationary, bivariate information set with the

time series variables of interest. The Granger direct test involves estimating the following reduced-form bivariate distributed lag model in order to examine the causal relationship between X and Y:

$$\begin{bmatrix} X_t \\ Y_t \end{bmatrix} = \begin{bmatrix} A^a(L) & B^b(L) \\ C^c(L) & D^d(L) \end{bmatrix} \begin{bmatrix} X_t \\ Y_t \end{bmatrix} + \begin{bmatrix} u_t \\ v_t \end{bmatrix} \qquad (t=1, \ldots, T)$$

where A(L), B(L), C(L) and D(L) are one-sided lag polynomials of order a, b ,c and d, respectively, in the lag operator L with roots outside the unit circle, and u and v are i.i.d. with zero mean and constant variance. For simplicity, it is also assumed that $E(u_t v_s) = 0$ for all t and s.

Under the null hypothesis of no causality from Y to X, B(L) will be zero, while C(L) will be zero for the case when X has no explanatory power for Y. Feedback or bi-directional causality between X and Y exists when both null hypotheses are rejected, whereas X and Y are not causally related when both are accepted. To carry out the Granger test, F-statistics are computed to test the joint significance of the elements in both B(L) and C(L).

Spill-over Effect Across National Stock Market

Data and Sample Period

The data include daily closing stock market indices for the U.S., Bangladesh, Chile, Norway, Pakistan and Turkey. These data are obtained from Datastream. The indices used are the S&P 500 for the U.S. and the DSE price index for Bangladesh. The market indices used in each of the four markets are

created and calculated by Datastream. All indices are based on local currencies and do not include dividends. The indices of the five neglected markets are first translated in terms of U.S. dollar and then calculated the indices return. The returns for each market are expressed in percentages computed by multiplying the first difference of the stock market indices by 100.

Since we use daily closing prices we are faced with the problem of data synchronisation due to differences between the NY trading time and the trading time of each of the five foreign markets. The trading hours of the national stock exchanges are listed in table 1.

Table 1: Trading hours of the national stock exchanges

Stock Market	Local Time	New York Time
Bangladesh	10:30 - 13:00	23:30 - 2:00 (previous day)
Pakistan	10:15 - 14:00	0:15 - 4:00
Turkey	10:00 - 12:00 & 14:00 - 16:00	3:00 - 5:00 & 7:00 - 9:00
Norway	10:00 - 16:00	4:00 - 10:00
New York	**9:30 - 16:00**	**9:30 - 16:00**
Chile	10:30 - 11:20, 12:30 - 13:20 & 16:00 - 16:30	13:30 - 14:20, 15:30 - 16:20 & 19:00 - 19:30

To adjust for the time difference between the first four markets, Bangladesh, Pakistan, Turkey and Norway, and New York market, the daily price changes of these markets are calculated over the two successive closing prices after adjustment for this date difference, therefore, one-day lagged returns are used.

To illustrate, suppose R_t^{PAK} is the Pakistan closing price on Wednesday. Then ΔR_t^{PAK} is the return measured as the

difference between the closing price of Wednesday and the closing price of Tuesday. In such case, R_t^{US} is the New York closing price on the same day (12 hours later), and ΔR_t^{US} is the return measured as the difference between the closing price of Wednesday and the closing price of Tuesday. Therefore, given the trading hours stated above, in testing the lead-lag relationship, Pakistan takes the lead on Tuesday because closing time is on 4:00a.m. New York time, and New York takes the lag on the same day. However, when New York takes the lead on Tuesday, Pakistan takes the lag on Wednesday, 8 hours later, which is the next trading day in Pakistan.

Sample periods after October 1987 are used to avoid the effect of the serious market crash in U.S. The sample period is listed in table 2.

Table 2: Sample period of Spill-over Effect

	Bangladesh	Chile	Norway	Pakistan	Turkey
Date	1 Jun 90 - 31 Dec 97	5 Jul 89 - 31 Dec 97	5 Jan 88 - 31 Dec 97	1 Jun 90 - 31 Dec 97	5 Apr 88 - 31 Dec 97
Observations	1979	2216	2607	1979	2542

Granger Causality Between Aggregate Stock Price and Trading Volume

Data and Sample Period

The daily closing stock price indices and turnover volume of the five neglected markets (Bangladesh, Chile, Norway, Pakistan and Turkey) were obtained from Datastream. However, except Bangladesh, the stock price indices used in the other four markets' were created and calculated by the

Datastream instead of the countries' own market indices. Of course the turnover volume used in these market indices were also calculated by Datastream. The sample period is listed in the table 3.

Table 3: Sample period of Granger Causality

	Bangladesh	Chile	Norway	Pakistan	Turkey
Date	3 Jul 95 - 2 Jan 98	4 Jul 89 - 2 Jan 98	5 Apr 83 - 4 Mar 98	29 Jun 89 - 28 Jan 98	4 Apr 88 - 3 Mar 98
Observations	455	2104	3739	1969	2465

Although we are aware that a causality analysis may require an extended period, we are constrained by data availability in Bangladesh. Despite this shortcoming, the results of the present causality analysis would be qualitatively useful as a preliminary step to the causality test, as well as for their portfolio implications for relatively long-horizon investors. Natural logarithm of the turn over trading volume is used to make the volatility in comparative scale with stock returns.

CHAPTER IV

EMPIRICAL RESULTS

Day-of-the-Week Effect

Summary statistics of the day of the week effect on each of the market are presented in Appendix 1. All rates of return are expressed in percentage terms. For Turkey, Norway and Chile, returns on Monday cover the three day period from Friday closing to Monday closing. Returns on the first trading day after a holiday cover more than one calendar day. A significance level of 5% is used for the t-statistics.

Turkey

The mean return for the Turkey market is 0.28975% per day with standard deviation of 2.7655%. The number of observations is 2,540. There is a significant day-of-the-week effect. Tuesday is most significantly different from the grand mean with the highest t value of -3.35.

It is interesting to find that all trading days exhibit positive returns. Wednesday and Friday show the highest returns of 0.4137% and 0.4290% respectively. The lowest return is found on Tuesday with positive return of 0.1058%.

Pakistan

The mean return for Pakistan market is 0.0562% per day with a standard deviation of 1.3280%. The number of observations is 2,012. In Pakistan, the trading days are Sunday through Thursday. The data collected from the Datastream have been adjusted to reflect the change. Pakistan exhibits strong day-of the-week effect with all trading days having high t value. The most significant day is Thursday with a t value of -5.39. The lowest return is found on Thursday with negative returns of 0.1033%. The highest return is found on Monday with positive return of 0.1794%.

Norway

The mean return for Norway market is 0.0737% per day with standard deviation of 1.3234%. The number of observation is 3,777. There is day of the week effect. Both Monday and Friday are significant with a t value of -3.1 and 3.31 respectively. The highest return is on Friday with mean of 0.1449% while the lowest return is on Monday with mean of 0.0070%. This is consistent with Cross's findings that the mean returns on Friday is significantly higher on Friday than on Monday.

Chile

The mean return of Chile market is 0.0968% per day with standard deviation of 1.0034%. The number of observation is 2,189. There is significant day-of-the-week effect on Monday and Friday with t value of -9.10 and 6.56 respectively. The lowest return is found on Monday with negative return of

0.0985%. The highest return is found on Friday with positive return of 0.2375%. The result is consistent with Cross' findings that return is significantly higher on Friday than Monday.

Bangladesh

The mean return for Bangladesh market is 0.0581% with standard deviation of 2.3687%. The number of observation is 1,730. The trading days of Bangladesh are Sunday through Thursday. Data have been adjusted to reflect the change. There is significant day-of-the-week effect. The most significant day is Wednesday with a t value of 4.78. The highest return is on Wednesday with return of 0.3302%. The lowest return is on Sunday with negative return of 0.1493%.

Month-of-the-Year Effect

Summary statistics of the month-of-the-year effect are presented in Appendix 2. The monthly return is computed using the month end price. Data collected have been processed to determine the monthly return. In some markets, some whole months are holidays and were deleted for the study. Also, data of some months in the beginning year are not available in some markets. A significance level of 5% is used for the t-statistics.

Turkey

The mean return of the Turkey market is 6.8614% on a monthly basis with standard deviation of 17.1945%. The number of observation is 119 months. There is a significant month-of-the-year effect. The highest return is found on January with

positive return of 20.2886%. The lowest return is found on October with negative return of 0.1612%. The result shows January effect with January having the highest t value of 8.51.

Pakistan

The mean return of the Pakistan market is 1.2883% on a monthly basis with standard deviation of 9.0273%. The number of observation is 108. There is significant month-of-the-year effect. August has the highest t value of -5.70849. The highest return is found on December with return of 5.4225%. The lowest return is found on August with negative return of 3.6704%.

Norway

The mean return of the Norway market is 1.4928% on a monthly basis with standard deviation of 6.7971%. The number of observation is 179 months. There is a significant month-of-the-year effect. The highest return is found on January with positive return of 5.3007%. The lowest return is found on November with negative return of 1.6648%. The result shows January effect with January having the highest t value of 8.14.

Chile

The mean return of the Chile market is 2.4077% on a monthly basis with standard deviation of 6.8671%. The number of observation is 104 months. There is a significant month-of-the-year effect. The highest return is found on January with positive return of 5.2661%. The lowest return is found on

November with negative return of 0.2637%. The result shows January effect with January having the highest t value of 4.24.

Bangladesh

The mean return of the Bangladesh market is 1.3376% on a monthly basis with standard deviation of 13.7317%. The number of observation is 95. There is significant month-of-the-year effect. October has the highest t value of 6.93. The highest return is found on October with return of 11.1043%. The lowest return is found on April with negative return of 3.4631%.

Spill-Over Effect Across National Stock Market

All the returns of the six markets are stationary and pass the Dickey-Fuller test. Table 4 presents the means of returns, standard deviations of each country and the cross-correlation of returns with the U.S. market.

Table 4: Market characteristics of the neglected markets

	Bangladesh	Chile	Norway	Pakistan	Turkey
mean returns (US$)	0.045059%	0.08835%	0.062784%	0.01753%	0.094666%
standard deviations	2.209526	1.645127	1.300613	1.230794	2.989867
correlation with U.S.	-0.008794	0.071504	0.310539	0.05174	0.057500

The means of returns for all the neglected markets are positive and range between 0.018% (Pakistan) and 0.88% (Chile). The standard deviations of returns range between 1.231% (Pakistan) and 2.990% (Turkey). The correlations of returns range from a high of 0.310539 between Norway and the U.S., to a low of -0.008794 between Bangladesh and the U.S.

A higher correlation between Norway and the U.S. is expected because they are more industrialized countries and the communication network are more well-developed.

Results are presented in Table 5. The results show that markets in Chile experience a strong unidirectional causality effect from U.S. stock market returns. Null hypothesis of Granger non-causality at the 5 percent nominal significance level are all rejected in 8- & 12-day time lagged interval and 6 percent level in 4-day lagged. Also, it is found that a bi-directional causality between U.S. stock market returns to Norway market. Null hypothesis of Granger non-causality at the 5 percent nominal significance level are all rejected in each of the three time lagged interval (4-, 8- & 12-day). On the other hand, we find on causal relationship between Bangladesh, Turkey and the U.S. Granger non-causality cannot be rejected at any of the time lagged interval. Interesting enough, we found that there has a weak causality effect from Pakistan stock market returns to the U.S. market. Granger non-causality from stock returns to volume is rejected in 4-day time lagged interval in 6 percent significance.

Table 5: Granger Causality Tests between Neglected Markets' Return and U.S. Market Return

U.S. does not on Bangladesh

	Days' Lag		
	4	8	12
Observations	1975	1971	1967
F-Statistic	0.49185	0.45705	0.72895
Probability	0.74175	0.88654	0.72411

Bangladesh does not on U.S.

	4	8	12
F-Statistic	0.41281	0.31094	0.39246
Probability	0.79953	0.96221	0.96680

U.S. does not on Chile

	Days' Lag		
	4	8	12
Observations	2212	2208	2204
F-Statistic	2.35973#	1.97036*	2.08823*
Probability	0.05135	0.04644	0.01495

Chile does not on U.S.

	4	8	12
F-Statistic	0.49284	0.97655	0.84569
Probability	0.74102	0.45233	0.60298

U.S. does not on Norway

	Days' Lag		
	4	8	12
Observations	2603	2599	2595
F-Statistic	4.42517*	2.95074*	1.88000*
Probability	0.00145	0.00275	0.03223

Norway does not on U.S.

	4	8	12
F-Statistic	6.05501*	3.76595*	3.12506*
Probability	7.6E-05	0.00021	0.00020

U.S. does not on Pakistan

	Days' Lag		
	4	8	12
Observations	1975	1971	1967
F-Statistic	0.84229	0.62269	0.56540
Probability	0.49824	0.75941	0.87115

Pakistan does not on U.S.

	4	8	12
F-Statistic	2.29985#	1.26946	0.88533
Probability	0.05669	0.25500	0.56154

U.S. does not on Turkey

	Days' Lag		
	4	8	12
Observations	2538	2534	2530
F-Statistic	1.50894	1.38704	1.20651
Probability	0.19685	0.19692	0.27199

Turkey does not on U.S.

	4	8	12
F-Statistic	0.65638	0.73923	0.67899
Probability	0.62237	0.65687	0.77323

*: rejected at 5% confident intervals
#: rejected at 10% confident intervals

Causality tests help us in understanding the nature of international market linkages in the short run. The difference in the international pattern of causal

relationship is related to the characteristics of each national market. There may be a difference in the degree of financial market segmentation because of government restrictions or controls of capital flows. Moreover, differences exist in information costs, settlement and other business practices, investment perception of risk, and the like. The two way causality in Norway and the U.S. market indices may be attributable to the closer of real economies due to trade and direct investments as well as the degree of capital market segmentation. Abstracting from transaction costs, and conditional on some deterministic time path, the presence of causality indicates a joint market inefficiency and hence a potential for short-term arbitrage between the markets.

Granger Causality Between Aggregate Stock Price and Trading Volume

Although not presented here, the autocorrelation functions for the natural logarithm of daily trading volume in Turkey display a steady growing characteristic of integrated time series. This autocorrelation pattern suggests that differencing might be the appropriated transformation to make volume stationary. We conduct Dickey-Fuller tests, which indicate an autoregressive unit root for the data sample. Based on the Dickey-Fuller test results, trading volume is expressed as $\ln(V_t/V_{t-1})$.

Results are presented in Table 6. As we can see that, markets in Norway, Pakistan and Turkey experience a strong

causality effect from stock returns to trading volume. Null hypothesis of Granger non-causality at the 5 percent nominal significance level are all rejected in the each of the three time lagged interval (4-, 8- & 12-day). Moreover, the Granger test shows evidence of unidirectional causality from stock returns to volume changes in both Norway and Turkey markets. On the other hand, in Pakistan market, Granger non-causality from volume changes to stock returns can be rejected at 5 percent significance in 12-day time lagged and 7 percent significance in 4-day time lagged. We conclude that there is a medium causality effect from trading volume to stock returns in this market. In Bangladesh, there is a medium causality effect from stock returns to trading volume. Granger non-causality from stock returns to volume in both 8-day and 12-day time lagged is rejected in 5 percent significance. Finally, in Chile, there only has a weak causality effect from stock returns to trading volume. Granger non-causality from stock returns to volume is rejected only in 4-day time lagged interval and in 8 percent significance.

Table 6: Granger Causality Tests of Stock Return and Trading Volume in Neglected Markets

Bangladesh:

Volume does not on Return

	Days' Lag		
	4	8	12
Observations	451	447	443
F-Statistic	1.41902	1.43707	1.09438
Probability	0.22663	0.17879	0.36295

Return does not on Volume

	4	8	12
F-Statistic	1.03257	2.19340*	2.02771*
Probability	0.38996	0.02696	0.02078

Chile:
Volume does not on Return

	Days' Lag		
	4	8	12
Observations	2100	2096	2092
F-Statistic	0.92853	1.47661	1.34428
Probability	0.44629	0.16052	0.18636

Return does not on Volume

	4	8	12
F-Statistic	2.12243#	1.14146	1.05980
Probability	0.07560	0.33188	0.39052

Norway:
Volume does not on Return

	Days' Lag		
	4	8	12
Observations	3735	3731	3727
F-Statistic	1.14526	1.61890	1.11641
Probability	0.33323	0.11396	0.34129

Return on does not Volume

	4	8	12
F-Statistic	8.24487*	4.93671*	4.24419*
Probability	1.3E-6	4.3E-06	1.1E-06

Pakistan
Volume does not on Return

	Days' Lag		
	4	8	12
Observations	1965	1961	1957
F-Statistic	2.24948#	1.23986	2.46044*
Probability	0.06155	0.27148	0.00346

Return does not on Volume

	4	8	12
F-Statistic	3.75662*	3.16520*	3.09993*
Probability	0.00475	0.00144	0.00023

Turkey:
Difference in Volume does not on Return

	Days' Lag		
	4	8	12
Observations	2460	2456	2452
F-Statistic	1.21351	0.83242	0.76187
Probability	0.30291	0.57389	0.69058

Return does not on Difference in Volume

	4	8	12
F-Statistic	28.7791*	18.4284*	14.3027*
Probability	0.00000	0.00000	0.00000

*: rejected at 5% confident intervals
#: rejected at 10% confident intervals

There are several explanations for the presence of a causal relation between stock prices and trading volume. First, the sequential information arrival models of Copeland (1976)

and Jennings, Starks, and Fellingham (1981) suggest a positive causal relation between stock prices and trading volume in either direction. In these asymmetric information models, new information flows into the market and is disseminated to investors one at a time. This pattern of information arrival produces a sequence of momentary equilibria information equilibrium is achieved. Due to the sequential information flow, lagged trading volume could have predictive power for current absolute stock returns and lagged absolute stock returns could have predictive power for current trading volume [Hiemstra and Jones (1994)].

Tax- and non-tax-related motives for trading are a second explanation. Tax-related motives are associated with the optimal timing of capital gains and losses realized during the calendar year. Non-tax-related motives include window dressing, portfolio rebalancing, and contrarian strategies. Lakonishok and Smidt (1989) show that current volume can be related to past stock price changes due to tax-and non-tax-related trading motives. The dynamic relation is negative for tax-related trading motives and positive for certain non-tax-related trading motives [Hiemstra and Jones (1994)].

A third explanation involves the mixture of distributions models of Clark (1973) and Epps and Epps (1976). These models provide differing explanations for a positive relation between current stock return variance and trading volume. Trading volume is used to measure disagreement as traders revise their reservation prices based on the arrival

of new information into the market. The greater the degree of disagreement among traders, the larger the level of trading volume. Their model suggests a positive causal relation running from trading volume to absolute stock returns [Hiemstra and Jones (1994)].

Noise trader models provide the fourth explanation for a causal relation between stock returns and trading volume. These models can reconcile the difference between the short- and long-run autocorrelation properties of aggregate stock returns. Aggregate stock returns are positively autocorrelated in the short run, but negatively autocorrelated in the long run. Since noise traders do not trade on the basis of economic fundamentals, they impart a transitory mispricing component to stock prices in the short run [Hiemstra and Jones (1994)].

The causal relationships indicate the presence of market inefficiency in these neglected markets. Market asymmetry provide profitable arbitrage in the short run in the absence of transaction costs and barriers.

CHAPTER V

CONCLUSION

This project aims to study the neglected markets in four areas: Day-of-the-Week effect, Month-of-the-Year effect, Spill-Over effect across national stock markets, and Granger Causality between aggregate stock price and trading volume. Granger causality tests and t-statistics are used for the purpose of our study. Data used in this project are collected from Datastream.

This project come to the following results. First, stock markets in Bangladesh and Turkey are found not to have any causal relationships with the U.S. market while those of Chile, Norway and Pakistan do exhibit causal relationships. Unidirectional causal effect is found from the U.S. stock market to Chile market where bi-directional causal effect is found between the Norway and U.S. markets. Interestingly, a weak causal effect from the Pakistan stock market to U.S. market has been found. Second, the results also suggest that all the five neglected markets have Day-of-the-week and Month-of-the-year effect. Finally, causal relationships between stock returns and trading volume are found to be present in the neglected markets. The result of Granger Causality tests shows mainly a unidirectional causal relationship from stock returns to trading volume in the

sample period in all neglected markets except Pakistan. In Pakistan, however, a bi-directional relationship exist.

The basic arguments in favor of international diversification are that foreign investments offer additional profit potentials while they can reduce the total risk of the portfolio. Domestic securities tend to move in the same direction because they are similarly affected by domestic conditions, such as money supply announcement, movements in interest rates, budget deficit, and national growth. This creates a strong positive correlation among all national securities traded in the same market. Investors have searched for methods to spread their risks and diversify away the national market risk. Foreign capital markets, in their variety, provide good potential for diversification beyond domestic instruments and markets. In general, this paper finds that the correlations between the neglected markets and the U.S. market is low. The implication is that international investor can time the markets by buying those markets that are expected to go up. It also allows investors to spread risk, since some of the neglected markets are not correlated to the U.S. market. Actually, this reasoning is simply a variation on the traditional domestic diversification argument, except that it is extended to a larger universe of fairly independent markets.

The degree of independence of a stock market is directly linked to the independence of a nation`s economy and

government policies. To some extent, common world factors affect expected cash flows of all firms and therefore their stock prices. However, purely national or regional factors seem to play an important role in asset prices, leading to sizable differences in the degrees of independence between markets. It is clear that constraints and regulations imposed by national governments, technological specialization, independent fiscal and monetary policies, and cultural and sociological differences all contributed to the degree of a capital market's independence. On the other hand, when there are closer economic and government policies, it is observed that more commonality in capital market behavior.

Our results contribute to the investors by providing them with the five countries' market efficiency and anomalies. The information can help them improve performance by taking the advantage of short-term arbitrage in some markets. Likewise, global equity investors can use our results to examine the correlation as well as the causal relationship between the five markets and the U.S. to construct a better portfolio with higher rate of return and less risk.

Direction for Further Studies

Our research findings may shed some light for the future theoretical and empirical research on the neglected markets. Because of the time difference in the national markets mentioned in the part of spill-over effect across national markets, the exchange rate we used in the tests may present

a problem. To alleviate this problem, the exchange rate used to convert the neglected markets stock indices to dollars in future studies can use the rate quoted around noon time (not closing rate) at the day of trading in New York. An interesting extension in this area is the examination of a three-way relation involving exchanges rates as well as fund prices and national stock market indices.

On the other hand, future studies in the part of Granger causality test between stock return and trading volume can remove systematic day-of-the-week and month-of-the-year calendar effects from stock returns and percentage volume changes using a two-step procedure similar to the one used in Gallant, Rossi, and Tauchen (1992). Also they can consider using the non-linear Granger causality tests presented in Hiemstra and Jones (1994) to determine any non-linear theoretical mechanisms and empirical regularities. This may give more information about the neglected markets to the investors.

Summary Statistics (Day of the Week Effect)

	Monday	Tuesday	Wednesday	Thursday	Friday	**Grand**
Turkey						
Mean	0.1908%	0.1058%	0.4137%	0.3087%	0.4290%	**0.2897%**
Std. Dev.	3.4112%	2.5943%	2.6628%	2.6309%	2.4231%	**2.7655%**
N	505	509	509	509	508	**2540**
t	-1.80	-3.35	2.26	0.35	2.54	
Prob>1.96 or Prob<-1.96						

Most significant day: Tuesday

	Sunday	Monday	Tuesday	Wednesday	Thursday	
Pakistan						
Mean	-0.0850%	0.1794%	0.1402%	0.1303%	-0.1033%	**0.0562%**
Std. Dev.	1.4394%	1.3362%	1.2977%	1.2585%	1.2738%	**1.3280%**
N	406	420	425	391	370	**2012**
t	-4.77	4.16	2.84	2.50	-5.39	
Prob>1.96 or Prob<-1.96						

Most significant day: Thursday

	Monday	Tuesday	Wednesday	Thursday	Friday	
Norway						
Mean	0.0070%	0.0326%	0.0743%	0.1097%	0.1449%	**0.0737%**
Std. Dev.	1.5154%	1.4385%	1.2564%	1.2780%	1.0883%	**1.3234%**
N	742	766	768	744	757	**3777**
t	-3.10	-1.91	0.03	1.67	3.31	
Prob>1.96 or Prob<-1.96						

Most significant day: Friday

	Monday	Tuesday	Wednesday	Thursday	Friday	
Chile						
Mean	-0.0985%	0.0867%	0.1186%	0.1420%	0.2375%	**0.0968%**
Std. Dev.	1.0202%	1.0247%	0.9654%	1.0141%	0.9650%	**1.0034%**
N	441	439	440	433	436	**2189**
t	-9.10	-0.47	1.02	2.11	6.56	
Prob>1.96 or Prob<-1.96						

Most significant day: Monday

	Sunday	Monday	Tuesday	Wednesday	Thursday	
Bangladesh						
Mean	-0.1493%	0.0361%	-0.1140%	0.3302%	0.1982%	**0.0581%**
Std. Dev.	2.9701%	1.6214%	2.0250%	2.3597%	2.6089%	**2.3687%**
N	349	340	356	342	343	**1730**
t	-3.64	-0.39	-3.02	4.78	2.46	
Prob>1.96 or Prob<-1.96						

Most significant day: Wednesday

Summary Statistics (Month of the Year Effect)

	January	February	March	April	May	June	July	August	September	October	November	December	Grand
Turkey													
Mean	20.2886%	4.9286%	2.2123%	4.1357%	1.5016%	15.4102%	2.2520%	2.1328%	12.6449%	-0.1612%	6.4594%	10.2594%	6.8614%
Std. Dev.	24.7664%	20.5275%	12.5411%	19.0587%	9.6606%	15.9495%	11.2495%	11.0827%	21.5110%	10.9092%	19.5399%	17.2716%	17.1945%
N	10	10	10	9	10	10	10	10	10	10	10	10	119
t	8.518646	-1.22623	-2.94955	-1.72928	-3.40041	5.423591	-2.92435	-2.99994	3.6692348	-4.45537	-0.25505	2.155791	
Prob>1.98 or Prob<-1.98													
Most significant month: January													
Pakistan													
Mean	-0.8032%	1.5902%	-3.2450%	2.5801%	-0.2763%	3.6124%	5.2691%	-3.6704%	0.7516%	2.8853%	2.1587%	5.4225%	1.2883%
Std. Dev.	10.2103%	5.8230%	4.7320%	9.0076%	5.4745%	4.3226%	15.6685%	5.2939%	5.0534%	6.2025%	13.6809%	12.9943%	9.0273%
N	10	10	10	7	8	9	9	9	9	9	9	9	108
t	-2.40775	0.347526	-5.21879	1.487176	-1.80113	2.675592	4.582782	-5.70849	-0.617785	1.838534	1.002067	4.759401	
Prob>1.98 or Prob<-1.98													
Most significant month: August													
Norway													
Mean	5.3007%	1.6397%	2.7299%	3.1324%	2.0648%	-0.8765%	3.5849%	1.0326%	-0.4169%	-1.1552%	-1.6648%	2.6513%	1.4928%
Std. Dev.	8.1492%	5.5203%	6.1362%	5.2391%	4.1345%	6.5138%	6.9342%	7.1290%	4.7271%	9.8653%	8.2404%	5.1637%	6.7971%
N	15	15	15	14	15	15	15	15	15	15	15	15	179
t	7.495301	0.289153	2.435154	3.227272	1.125876	-4.66362	4.118127	-0.90593	-3.75893	-5.21222	-6.21532	2.28028	
Prob>1.98 or Prob<-1.98													
Most significant month: January													
Chile													
Mean	5.2661%	4.3545%	0.7752%	0.4288%	4.0717%	4.0747%	0.8712%	1.0679%	1.7698%	2.4373%	-0.2637%	4.0186%	2.4077%
Std. Dev.	9.6320%	7.6613%	7.8148%	4.2197%	4.6836%	5.6576%	4.4219%	8.3912%	5.7915%	6.3351%	8.1491%	7.9068%	6.8671%
N	9	9	9	8	8	8	8	9	9	9	9	9	104
t	4.244855	2.891118	-2.42431	-2.93877	2.471131	2.475477	-2.28181	-1.98978	-0.947398	0.043941	-3.96721	2.392312	
Prob>1.98 or Prob<-1.98													
Most significant month: January													
Bangladesh													
Mean	0.8039%	-1.9072%	0.5536%	-3.4631%	0.9559%	4.6752%	1.2700%	-0.8064%	7.3682%	11.1043%	-1.9205%	-3.1828%	1.3376%
Std. Dev.	17.8148%	4.2086%	18.6036%	8.5232%	10.5186%	13.3963%	9.6057%	6.3658%	14.8885%	27.1869%	8.6808%	9.4488%	13.7317%
N	8	8	8	7	8	8	8	8	8	8	8	8	95
t	-0.37882	-2.30317	-0.5565	-3.40758	-0.27091	2.369008	-0.048	-1.52179	4.280526	6.932463	-2.31262	-3.2086	
Prob>1.98 or Prob<-1.98													
Most significant month: October													

Bibliography

1. Antoniewicz, R., 1992, A Causal Relationship Between Stock Returns and Volume, Working paper Federal Reserve Board.

2. Aybar, C. B., 1992, Descriptive Analysis of Stock Return Behavior in An Emerging Equity Market: The Case of Turkey (Emerging markets), PH. D. paper, 1-248.

3. Baillie, R. T. and R. P. DeGennaro, 1990, Stock Returns and Volatility, Journal of Financial and Quantitative Analysis 25, 203-215.

4. Beck, K. G., J. E. Finnerty and M. Gupta, 1990, The Intertemporal Relation Between the U.S. and Japanese Stock Markets, Journal of Finance 45, 1297-1306.

5. Ben-Zion, U., J.J. Choi and S. Hauser, 1996, The Price Linkages Between Country Funds and National Stock Markets: Evidence from Cointegration and Causality Tests of Germany, Japan and UK funds, Journal of Business Finance & Accounting 23, Iss. 7, 1005-1017.

6. Berges, McConnell, and Schlarbaum, 1984, The Turn of the Year in Canada, Journal of Finance 39, 185-192.

7. Bodie, Kane and Marcus, Investments, 3rd ed.

8. Bollerslev, R. Chou, and K. F. Kroner, 1992, ARCH Modelling in Finance: A Review of Theory and Empirical Evidence, Journal of Econometrics 52, 5-59.

9. Bollersley, T., 1990, Modelling the Coherence in Short-run Nominal Exchange Rates: A Multivariate Generalized ARCH model, Review of Economics and Statistics 72, 498-505.

10. Chamberlain, G., 1982, The General Equivalence of Granger and Sims causality, Econometrica 50, 569-582.

11. Cheung, D. W. W., 1997, Pacific Rim Stock Market Integration Under Different Federal Funds Rate Regimes, Journal of Business Finance & Accounting 24, 1343-1351.

12. Chou, R. Y., 1988, Volatility Persistence and Stock Valuations: Some Empirical Evidence Using GARCH, Journal of Applied Ecomometrics 3, 279-294.

13. Clark, P. K., 1973, A Subordinated Stochastic Process Model with Finite Variance for Speculative Prices, Econometrica 41, 135-155.

14. Clark, P., 1973, A Subordinated Stochastic Process Model with Finite Variances for Speculative Prices, Econometrica 41, 135-155.

15. Copeland, T., 1976, A Model of Asset Trading under the Assumption of Sequential Information Arrival, Journal of Finance 31, 135-155.

16. Cornell, B., 1981, The Relationship Between Volume and Price Variability in Futures Markets, The Journal of Futures Markets 1, 303-316.

17. Cross, F., 1973, The Behavior of Stock Prices on Fridays and Mondays, Financial Analysts Journal, 67-69.

18. DeFusco, McCabe, and Yook, 1993, Day of the week effects: A test of the information timing hypothesis, Journal of Business Finance & Accounting, 835-842.

19. Dickey, A. D. and W. A. Fuller, 1981, Likelihood Ratio Statistics for Autoregressive Time-Series with a Unit Root, Econometrica 49, 1057-1072.

20. Edward, A. and Edwin, D., 1992, Odd-Lot Transactions Around the Turn of the Year and the January Effect, Journal of Financial & Quantitative Analysis, 591-604.

21. Engle, R. F., D. M. Lilien, and R. P. Robins, 1987, Estimating Time Varying Risk Premia in the Term Structure: The ARCH-M model, Econometrica 55, 391-407.

22. Epps, T, and M. Epps, 1976, The Stochastic Dependence of Security Price Changes and Transaction Volumes: Implications for the Mixture of Distributions Hypothesis, Econometrica 44, 305-321.

23. Eun, C. S. and S. Shim, 1989, International Transmission of Stock Market Movements, Journal of Financial and Quantitative Analysis 24, 241-256.

24. Fischer, K. P. and A. P. Palasvirta, 1990, High Road to Global Marketplace: The International Transmission of Stock Fluctuations, The Financial Review 25, 371-394.

25. Fortin, R., 1990, Transaction Costs and Day-of-the-Week Effects in the OTC/NASDAQ Equity Market, Journal of Financial Research, 243-248.

26. French, K., 1980, Stock Returns and Weekend Effect, Journal of Financial Economics, 55-69.

27. French, K. R., G. W. Schwert and R. F. Stambaugh 1987, Expected Stock Returns and Volatility, Journal of Financial Economics 19, 3-30.

28.Gallant, R., P. Rossi, and G. Tauchen, 1992, Stock Prices and Volume, Review of Financial Studies 5, 199-242.

29.Geweke, J., Messe, R. and Dent, W., 1983, Comparing Alternatives Tests of Causality in Temporal System: Analytic Results and Experimental Evidence, Journal of Econometrics 21, 161-194.

30.Granger, C. W. J., and O. Morgenstern, 1963, Spectral Analysis of New York Stock Market Prices, Kyklos 16, 1-27.

31.Hamao, Y., R, W. Masulis, and V. K. Ng, 1990, Correlations in Price Changes and Volatility Across International Stock Markets, Review of Financial Studies 3, 281-307.

32.Harris, L., 1983, The Joint Distribution of Speculative Prices and of Daily Trading Volume, Working paper, Univ. of Southern CA.

33.Hiemstra, C. and J Jones, 1994, Testing for Linear and Non-linear Granger Causality in the Stock Price-Volume Relation, Journal of Finance 49, Iss. 5, 1639-1664.

34.Jain, P., and G. Joh, 1988, The Dependence Between Hourly Prices and Trading Volume, Journal of Financial and Quantitative Analysis 23, 269-283.

35.Jennings, R., L. Starks, and J. Fellingham, 1981, An Equilibrium Model of Asset Trading with Sequential Information Arrival, Journal of Finance 36, 143-161.

36.Jones, J., 1989, A Comparison of Lag-length Selection Techniques in Tests of Granger Causality Between Money Growth and Inflation: Evidence for the U.S., 1959-86, Applied Economics 21, 809-822.

37.Karpoff, J., 1987, The Relation Between Price Changes and Trading Volume: A Survey, Journal of Financial and Quantitative Analysis 22, 109-126.

38.Keim, D., Size Related Anomalies and Stock Return Seasonality: Further Empirical Evidence, Journal of Financial Economics 16, 13-32.

39.Koch, P. D. and T. W. Koch, 1991, Evolution in Dynamic Linkage Across Daily National Stock Indexes, Journal of International Money and Finance 10, 231-251.

40.Lakonishok, J., and S, Smidt, 1989, Past Price Changes and Current Trading Volume, The Journal of Portfolio Management 15, 18-24.

41. Lamoureux, C. G. and W. D. Lastrapes, 1990, Persistence in Variance, Structural change, and the GARCH Model, Journal of Business and Economic Statistics, 225-234.

42. Marathe, A. 1994, Studies on Equity Market Behavior, PHD (ADAI), 1-137.

43. Martikainen, T. and Puttonen, V. 1996, Finnish Day of the Week Effects, Journal of Business Finance & Accounting, 1019-1032.

44. Osborne, M. F. M., 1959, Brownian Motion in the Stock Market, Operations Research 7, 145-173.

45. Pfleiderer, P., 1984, The Volume of Trade and the Variability of Prices: A Framework for Analysis in Noisy Rational Expectations Equilibria, Working paper, Stanford Univ.

46. Poon, S. H. and S. J. Taylor, 1992, Stock Returns and Volatility: An Empirical Study of U.K. Stock Market, Journal of Banking and Finance 16, 37-59.

47. Poterba, J. M. and L. H. Summers, 1986, The Persistence of Volatility and Stock Market Returns, American Economic Review 76, 1142-1151.

48. Richardson, G., S. E. Sefcik and R. Thompson, 1986, A Test of Dividend Irrelevance Using Volume Reaction to a Change in Dividend Policy, Journal of Financial Economics 17, 313-333.

49. Rogalski, R., 1978, The Dependence of Prices and Volume, Review of Economics and Statistics 36, 268-274.

50. Rogalski, R., and S. Tinic., The January Size Effect: Anomaly or Risk Measurement?, The Financial Analyst Journal 42

51. Rutledge, D. J. S., 1984, Trading volume and price variability: New Evidence on the Price Effects of Speculation, In Selected Writings on Futures Markets: Research Directions in Commodity Markets, 1970-1980, A. E. Peck, ed. Chicago: Chicago Board of Trade, 237-251.

52. Smirlock, M., and L. Starks, 1988, An Empirical Analysis of the Stock Price-Volume Relationship, Journal of Banking and Finance 17, 164-178.

53. Tauchen, G. and M. Pitts, 1983, The Price Variability-Volume Relationship on Speculative Markets, Econometrica 51, 485-505.

54. Taylor, S. J., 1982, Financial Returns Modelled by the Product of Two Stochastic Processes, a Study of Daily Sugar Prices 1961-79, in O. D. Anderson (eds.), Time Series Analysis: Theory and Practice, 203-226.

55. Thaler, R., 1987, Seasonal Movements in Securities Prices II: Weekend, Holiday, Turn of the Month, and Intraday Effects, Economic Perspectives, 169-177.

56. Theodossiou, P. and U. Lee, 1993, Mean and Volatility Spill-overs Across Major National Stock Markets: Further Empirical Evidence, Journal of Financial Research 16, Iss. 4, 337-350.

57. Thornton, D, and D. Batten, 1985, Lag-length Selection and Tests of Granger Causality Between Money and Income, Journal of Money, Credit, and Banking 17, 164-178.

58. Von Furstenberg, G. M. and B. N. Jeon, 1989, International Stock Price Movements: Links and Messages, Brookings Papers on Economic Activity 1, 125-179.